4.7.2.3 Idaho National Engineering Laboratory

4.7.2.3.1 *Land Resources*

In addition to the storage alternatives, INEL is being considered as a site for the three other DOE programs identified in Table 4.7.1–1. The total area of undisturbed land that could be affected by these programs during operation is 328 ha (812 acres), or less than 0.2 percent of the total land at INEL. Site development would be performed in accordance with the land-use plans in the *INEL Site Development Plan*. Proposed development would also be compatible with the industrial use visual character of the developed areas of INEL. Cumulatively, the actions would consume land, but would be consistent with the land-use plans and visual character of the site.

4.7.2.3.2 *Site Infrastructure*

Some cumulative impacts are possible from siting the storage alternatives at INEL if facilities resulting from the three other DOE programs identified in Table 4.7.1–1 are also located at INEL. The site infrastructure cumulative impacts that would result at INEL from operation of all the proposed projects are shown in Table 4.7.2.3.2–1. INEL has adequate site availability for all of the site infrastructure resource requirements except for coal. Additional coal requirements would be satisfied using the current procurement practices at the site.

Table 4.7.2.3.2–1. Site Infrastructure Cumulative Impacts at Idaho National Engineering Laboratory

	Electrical		Fuel	
Requirement	Energy (MWh/yr)	Peak Load (MWe)	Oil (l/yr)	Coal (t/yr)
No Action	232,500	42	5,820,000	11,340
Storage and Disposition	58,000[a]	10[a]	140,000[b]	14,000[a]
Foreign Research Reactor Spent Nuclear Fuel	1,000	NA	NA	NA
Spent Nuclear Fuel	2,200	NA	330,000	NA
Waste Management	NA	15.8	NA	NA
Cumulative Requirement	293,700	67.8	6,290,000	25,340
Site Availability	394,200	124	16,000,000	11,340

[a] Collocation Alternative.
[b] Upgrade with All or Some RFETS and LANL Pu material alternative.
Note: NA=data was not analyzed in the associated EIS.
Source: DOE 1995j; DOE 1995cc; DOE 1996g; Table 4.2.3.2–1.

4.7.2.3.3 *Air Quality and Noise*

Cumulative impacts to air quality at INEL include impacts from the No Action Alternative emissions, three other DOE programs identified in Table 4.7.1–1, and the proposed facilities for each alternative. Concentrations are calculated for these emissions and are then compared to Federal and State regulations and guidelines to determine compliance.

The INEL is currently in compliance with the NAAQS as well as State regulations and guidelines. Air emissions attributable to the storage alternatives would increase concentrations of criteria pollutants. Potential cumulative impacts are presented in Table 4.7.2.3.3–1. The resulting concentrations from cumulative impacts would be in compliance with Federal and State regulations.

Cumulative noise impacts include contributions from existing and planned facilities plus proposed storage facilities at the site. Noise impacts may result both from onsite noise sources and from offsite sources such as

Table 4.7.2.3.3–1. Estimated Cumulative Operational Concentrations of Pollutants at Idaho National Engineering Laboratory and Comparison With Most Stringent Regulations or Guidelines—No Action and Storage Alternatives

Pollutant	Averaging Time	Most Stringent Regulations or Guidelines[a] ($\mu g/m^3$)	No Action ($\mu g/m^3$)	Other Onsite Activities[b] ($\mu g/m^3$)	Upgrade ($\mu g/m^3$)	Consolidation ($\mu g/m^3$)	Collocation ($\mu g/m^3$)
Criteria Pollutants							
Carbon monoxide	8-hour	10,000[c]	284	18	302.4	303.4	303.6
	1-hour	40,000[c]	614	605	1220	1222	1223
Lead	Calendar Quarter	1.5[c]	0.001	0.004	0.005	0.005	0.005
Nitrogen dioxide	Annual	100[c]	4	7	11.02	11.73	11.91
Ozone	1-hour	235[c]	[d]	[d]	[d]	[d]	[d]
Particulate matter less than or equal to 10 microns in diameter	Annual	50[c]	5	0	5.01	5.05	5.06
Sulfur dioxide	24-hour	150[c]	80	6	86.14	86.98	87.17
	Annual	80[c]	6	0	6.01	7.25	7.53
	24-hour	365[c]	135	2	137.3	160.5	165.7
	3-hour	1,300[c]	579	12	592.2	693.3	716.2
Mandated by Idaho							
Total suspended particulate	Annual	60[e]	5	0	5.1	5.05	5.06
	24-hour	150[e]	80	6	86.4	86.98	87.17
Hazardous and Other Toxic Compounds							
Ammonia	Annual	180[f]	6.0	0.0007	6.0	6.0	6.0
Chlorine	Annual	30[f]	[g]	0	[g]	<0.01[h]	<0.01[h]
Hydrogen chloride	Annual	7.5[f]	0.98	0.092	1.07	1.07	1.07
Hydrazine	Annual	0.00034[f]	0.000001	0	0.000001	0.000004	<0.000004
Mercury	Annual	1[f]	0.042	0.0014	0.0434	0.0434	0.0434
Nitric acid	Annual	50[f]	0.64	0.0013	0.6413	0.6413	0.6413

Table 4.7.2.3.3–1. Estimated Cumulative Operational Concentrations of Pollutants at Idaho National Engineering Laboratory and Comparison With Most Stringent Regulations or Guidelines—No Action and Storage Alternatives—Continued

Pollutant	Averaging Time	Most Stringent Regulations or Guidelines[a] ($\mu g/m^3$)	No Action ($\mu g/m^3$)	Other Onsite Activities[b] ($\mu g/m^3$)	Upgrade ($\mu g/m^3$)	Consolidation ($\mu g/m^3$)	Collocation ($\mu g/m^3$)
Hazardous and Other Toxic Compounds (continued)							
Phosphoric acid	Annual	10[f]	[g]	0	[g]	<0.01[h]	<0.01[h]
Sulfuric acid	Annual	10[f]	[g]	0.00085	[g]	<0.01[h]	<0.01[h]
Trivalent chromium	Annual	5[f]	0.036	0.0004	0.03604	0.03604	0.03604

[a] The more stringent of the Federal and State standard is presented if both exist for the averaging time.

[b] Other onsite activities include those associated with the Foreign Research Reactor Spent Nuclear Fuel, Spent Nuclear Fuel Management and Waste Management programs.

[c] Federal and State standard.

[d] Ozone, as a criteria pollutant, is not directly emitted nor monitored by the site. See Section 4.1.3 for a discussion of ozone-related issues.

[e] State standard or guideline

[f] Acceptable air concentrations listed in Rules for the Control of Air Pollution in Idaho apply only to new (not existing) sources and are used here only as reference levels.

[g] No sources of this pollutant have been identified.

[h] The concentration represents the alternative contribution and other onsite activities.

Source: 40 CFR 50; DOE 1995j; DOE 1995dd; DOE 1996b; DOE 1996g; FDI 1996a:1; ID DHW 1995a; ID DHW 1995c; IN DOE 1996a; Table 4.2.3.3–1.

traffic. Noise impacts on individuals from the storage facilities are expected to be small, resulting in little or no increase in noise levels at offsite areas. Little or no increase in cumulative noise impacts to individuals offsite is expected to occur.

4.7.2.3.4 *Water Resources*

Table 4.7.2.3.4–1 summarizes the estimated cumulative water usage for the storage alternatives and the three other DOE programs identified in Table 4.7.1–1. Water requirements during the operation of all the proposed projects would be obtained from groundwater resources. The cumulative water requirements for the site would be a 6-percent increase over the projected No Action water usage, or approximately 18.3 percent of the groundwater allotment. The operation of the Collocation Alternative would account for approximately 1.1 percent of the total annual cumulative water usage.

Because all wastewater could be recycled during operation, wastewater generated during construction would have the most impact. Table 4.7.2.3.4–2 summarizes the estimated volumes of cumulative wastewater discharged to ponds or recycled. The cumulative wastewater discharged would be a 27-percent increase in the projected discharge. Existing INEL treatment facilities could accommodate all the new cumulative process and wastewater streams.

Table 4.7.2.3.4–1. Cumulative Annual Water Usage at Idaho National Engineering Laboratory

Program	Water Requirements (million l/yr)
No Action	7,570[a]
Storage and Disposition	87[b,c]
Foreign Research Reactor Spent Nuclear Fuel	2.1[b]
Spent Nuclear Fuel	49
Waste Management	353[b,d]
Total annual cumulative water usage	8061.1

[a] Data represents groundwater usage.
[b] Data represents maximum value for the comparative scenario.
[c] Date represent the Collocation Alternative.
[d] Based on preliminary data.
Source: DOE 1995j; DOE 1995dd; DOE 1996g; INEL 1995a:1; Table 4.2.3.4–1.

Table 4.7.2.3.4–2. Cumulative Annual Wastewater Discharge at Idaho National Engineering Laboratory

Program	Nonhazardous Sanitary and Industrial Wastewater (million l/yr)
No Action	540
Storage and Disposition	12.8[a,b]
Foreign Research Reactor Spent Nuclear Fuel	1.6[a]
Spent Nuclear Fuel	49
Waste Management	85[a,c]
Total annual cumulative wastewater	688.4

[a] Data represents the Collocation Alternative during construction.
[b] Data represents maximum value for the comparative scenario.
[c] Based on preliminary data.
Source: DOE 1995j; DOE 1995dd; DOE 1996g; INEL 1995a:1; Table 4.2.3.4–1.

4.7.2.3.5 *Geology and Soils*

Cumulative impacts to geologic and soil resources are expected to be minor as a result of the storage alternatives and the other DOE programs identified in Table 4.7.1–1. A total of 328 ha (812 acres) could be disturbed at the site. Soil erosion and storm water control measures would be used during construction to minimize erosion from the disturbed areas. No valuable geologic resources would be affected by any of the planned programs.

4.7.2.3.6 *Biological Resources*

In addition to ongoing activities and the storage alternatives, INEL is being considered for the three other DOE programs identified in Table 4.7.1–1. Although many of these facilities would be located within developed areas of the site, certain environmental restoration and waste management facilities and consolidated or collocated storage facilities would be constructed on undeveloped land. The total area of undeveloped land required would be 328 ha (812 acres), or less than 0.2 percent of INEL. Due to the general lack of wetlands and aquatic resources at INEL, and the fact that facilities would be constructed away from the Big Lost River, cumulative impacts to these resources would not be expected. The cumulative loss of habitat could lead to additional impacts to special status species compared to those resulting from construction of a storage facility alone; however, their status on INEL would not be expected to be jeopardized. Species that could be affected include several State-status species such as the pygmy rabbit, a number of bat species, and oxytheca.

4.7.2.3.7 *Cultural and Paleontological Resources*

The three other DOE programs identified in Table 4.7.1–1 may require ground-disturbing construction, facility modification, and changes in land access and use at INEL. Construction at INEL under these programs is primarily proposed for developed areas which have either been surveyed or are disturbed and are therefore unlikely to contain cultural or paleontological resources. Prior to construction activity, specific surveys, evaluations, and Native American consultations would be conducted pursuant to NHPA, the *American Indian Religious Freedom Act*, and the *Native American Graves Protection and Repatriation Act*. Cumulative impacts resulting from the storage alternatives, if any, are expected to be minimal.

4.7.2.3.8 *Socioeconomics*

Cumulative impacts on INEL's regional economy, population, housing, community services, and local transportation would be minor. Generally, the regional economy would improve without burdening the housing market, but new traffic could lead to congestion on local roads. Table 4.7.2.3.8–1 shows the other DOE programs that are being considered at INEL. Because each of these programs is relatively small, their cumulative socioeconomic impact would be minor. The primary impact will be to stimulate regional economic growth. If all of these programs were located at INEL, transportation congestion could result as well as the demand for new housing and other public services. However, housing construction trends indicate that this additional population could be accommodated without significant impacts to the housing market.

Table 4.7.2.3.8–1. Socioeconomic Cumulative Impacts at Idaho National Engineering Laboratory

Program	Direct Employment[a]
Storage and Disposition[b]	561
Foreign Research Reactor Spent Nuclear Fuel	30
Spent Nuclear Fuel	0
Waste Management	4,925
Total	5,516

[a] Operations.

[b] Collocation Alternative.

Source: DOE 1996g; DOE 1995j; DOE 1995cc; Section 4.2.3.8.

4.7.2.3.9 *Public and Occupational Health and Safety*

Radiological Impacts. The maximum incremental radiological doses and resulting health effects for the storage alternative, the No Action Alternative and other actions planned at INEL, are presented Table 4.7.2.3.9–1. Although these impacts could be added, it should be noted that the exact locations of the facilities for planned actions may change. In addition, because each of these facilities is sited in a different location, the location of the MEI for each is also different. The MEIs have been selected to maximize the potential dose for a given facility. Since the MEI would have to be resident at more than one location simultaneously in order to receive the maximum dose from each facility, summing the doses would be misleading. The offsite population and total site workforce doses have not been summed because the population distribution and workforce totals as analyzed vary among the actions. [Text deleted.]

Chemical Impacts. For INEL, the various NEPA documents use different but otherwise acceptable methodologies to assess the health effects from hazardous chemical exposure for proposed activities. These methodologies may have different indicators for determining the health impact (for example, hazard index, cancer risk, or chemical concentration in the environment). These different indicators prevent a uniform quantitative cumulative impact analysis for this site. However, as indicated in the health impact analysis sections in the NEPA documents for the proposed actions, the health effect from any proposed action at INEL is predicted to contribute only slightly to the impacts from the baseline activity (No Action). The potential cumulative health impact from hazardous chemicals from implementation of the proposed activities would not exhibit a noticeable increase above the baseline, would be expected to fall within acceptable regulatory limits.

Table 4.7.2.3.9–1. Estimated Average Annual Cumulative Radiological Doses and Resulting Health Effects to the Public and Workers From Normal Operation at Idaho National Engineering Laboratory

	Maximally Exposed Individual Member of the Public		Offsite Population Within 80 km		Total Site Workforce	
Program	Total Dose (mrem)	Fatal Cancer Risk	Total Dose (person-rem)	Number of Fatal Cancers	Total Dose (person-rem)	Number Fatal Cancers
No Action	0.018	9.0×10^{-9}	2.4	1.2×10^{-3}	220	0.088
Storage and Disposition[a]	1.6×10^{-6}	8.0×10^{-13}	1.8×10^{-5}	9.0×10^{-9}	25	0.010
Foreign Research Reactor Spent Nuclear Fuel	5.6×10^{-4}	2.8×10^{-10}	4.5×10^{-3}	2.3×10^{-6}	33	0.013
Spent Nuclear Fuel	8.0×10^{-3}	4.0×10^{-9}	0.19	9.5×10^{-5}	5.4	2.2×10^{-3}
Waste Management	1.0	5.2×10^{-7}	8.4	4.2×10^{-3}	2.5	1.0×10^{-3}

[a] The impacts from the collocation storage facility are presented since they encompass both Pu and HEU storage.

Source: DOE 1995j; DOE 1995dd; DOE 1996g; Tables 4.2.3.9–1 and 4.2.3.9–2.

4.7.2.3.10 *Waste Management*

The actions and alternatives which could contribute to the cumulative impacts at INEL are listed in Table 4.7.2.3.10–1. The largest impact on radioactive waste management would result if INEL is selected as a regional treatment and disposal facility for LLW and mixed LLW or as a regional treatment facility for TRU waste as a result of the waste-type-specific RODs developed from the Waste Management PEIS. The next largest impact would result from the alternative considered in this PEIS for the Collocation Alternative for long-term storage analyzed for INEL. The *Department of Energy Programmatic Spent Nuclear Fuel and Idaho National Engineering Laboratory Environmental Restoration Waste Management Programs EIS* and the *Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel EIS* would have smaller impacts at INEL.

Table 4.7.2.3.10–1. Waste Management Cumulative Impacts at Idaho National Engineering Laboratory (2005)—Annual Volumes

Category	No Action[a] (m^3)	Storage and Disposition[b] (m^3)	Foreign Research Reactor Spent Nuclear Fuel[c] (m^3)	Spent Nuclear Fuel Management[d] (m^3)	Waste Management (m^3)	Total (m^3)
Spent Fuel	0	0	1.0 t	165 t	0	166 t
High Level						
Liquid	538	0	0	27	0	565
Solid	192	0	0	Included in liquid	0[e]	192
Transuranic						
Liquid	0	0.02	0	32	Included in solid	32
Solid	3.5	10	0	Included in liquid	2,790[f]	2,804
Mixed Transuranic						
Liquid	Included in TRU	0	0	Included in TRU	Included in TRU	0
Solid	Included in TRU	4	0	Included in TRU	Included in TRU	4
Low-Level						
Liquid	0	2.1	0	0	Included in solid	2.1
Solid	7,200	1,300	23	197	11,870[g]	20,600
Mixed Low-Level						
Liquid	4	0.2	0	0	Included in solid	4.4
Solid	170	66	0	0	2,725[h]	2,960
Hazardous						
Liquid	Included in solid	2	0	0	Included in solid	2
Solid	1,200	2	0	0	1,854[i]	3,056
Nonhazardous (Sanitary)						
Liquid	Included in solid	86,800	1,990	0	NA	88,740
Solid	52,000	1,720	NA	0	NA	53,720

Table 4.7.2.3.10–1. Waste Management Cumulative Impacts at Idaho National Engineering Laboratory (2005)—Annual Volumes—Continued

Category	No Action[a] (m^3)	Storage and Disposition[b] (m^3)	Foreign Research Reactor Spent Nuclear Fuel[c] (m^3)	Spent Nuclear Fuel Management[d] (m^3)	Waste Management (m^3)	Total (m^3)
Nonhazardous (Other)						
Liquid	0	Included in sanitary	Included in sanitary	601	68,170[j]	68,800
Solid	Included in sanitary	2,100[k]	NA	NA	NA	2,100

[a] No Action volumes from Table 4.2.3.10–1.

[b] Collocation Alternative.

[c] Alternative announced in Federal Register on May 17, 1996 (61 FR 25092).

[d] Also includes the site-specific environmental restoration and waste management analysis from Volume 2.

[e] Approximately 327 canisters (493 m^3) per year starting 2014.

[f] Represents the estimated TRU waste to be treated to LDR standards at INEL as a result of the TRU Waste Regionalized Alternative 3. The volume was obtained by taking the estimated inventory at INEL and the estimated inventory and 20-year projected generation for the offsite receipts, and dividing by 20 to get an annual estimate (Draft Waste Management PEIS, Vol. I of IV, Table 8.1–1, page 8–4).

[g] Represents the estimated LLW to be treated and disposed of at INEL as a result of the LLW Regionalized Alternative 5. The volume was obtained by taking the estimated inventory at INEL and the estimated inventory and 20-year projected generation for the offsite receipts, and dividing by 20 to get an annual estimate (Draft Waste Management PEIS, Vol. I of IV, Table 7.1–1, page 7–3).

[h] Represents the estimated mixed LLW to be treated and disposed of at INEL as a result of the Mixed LLW Regionalized Alternative 4. The volume was obtained by taking the estimated inventory at INEL and the estimated inventory and 20-year projected generation for the offsite receipts, and dividing by 20 to get an annual estimate (Draft Waste Management PEIS, Vol. I of IV, Table 6.1–1, page 6–3).

[i] Represents the estimated hazardous wastes to be treated at INEL as a result of the hazardous waste Regionalized Alternative 2 (Draft Waste Management PEIS, Vol. I of IV, Table 10.3–7, page 10–20).

[j] Represents the incremental increase of wastewater over No Action all alternatives. Annual volume estimated by assuming 365 days per year (Draft Waste Management PEIS, Vol. II, Tables II-6.4–8 [HLW], page 6–55; II-6.3–11 [TRU], page 6–45; II-6.1–16 [mixed LLW], page 6–19; II-6.2–2 [LLW], page 6–32; and II-6.5–10 [hazardous], page 6–67).

[k] Recyclable wastes.

Note: NA=data was not analyzed in the associated EIS.

Source: 60 FR 28680; 61 FR 9441; 61 FR 25092; DOE 1995cc; DOE 1995dd; DOE 1996g; DOE 1996n; Table 4.2.3.10–1.